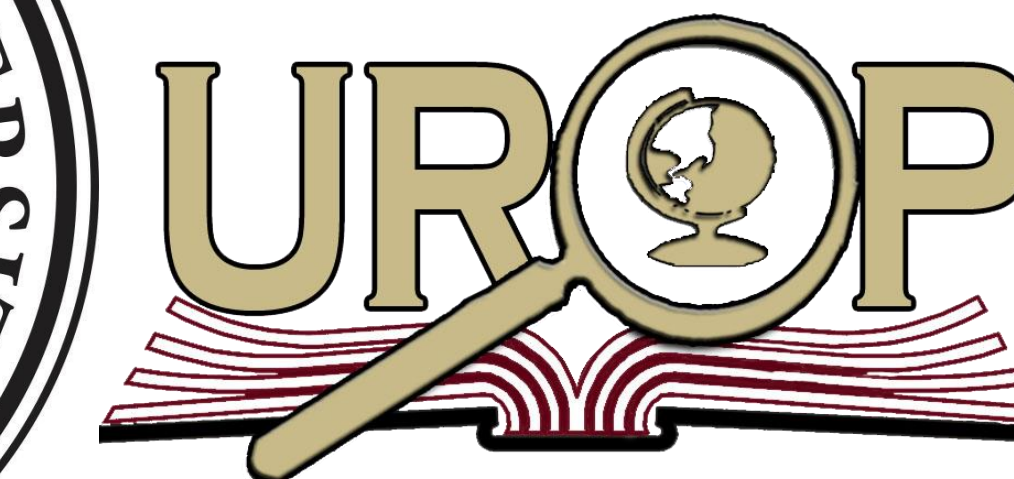


Peer-Mediated Modified Schema Based Instruction Targeting Mathematical Problem Solving for Students with Extensive Support Needs



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Purpose

- Peer-mediated instruction has positive impacts across a range of academics (i.e., language arts, mathematics, science, and social studies) for students with disabilities, regardless of their disability (Okilwa and Shelby, 2010).
- Peer-mediated instruction supports growth and development of both the mentee and the mentor.
- Alegre-Ansuategui et al. (2017) later supported this finding within their meta-analysis of peer mediating instruction and academic achievement in mathematics.
- Modified schema-based instruction has been shown to be effective within the literature as an intervention package to increase mathematical skills among students with ESN across a range of math contents and contexts.
- Ley Davis (2016) used peer-mediated MSBI with middle-school aged students targeting additive math problems. Results indicated a functional relation.

Research Questions

RQ 1: Did MSBI work?

What is the effect of peer-delivered modified-schema based instruction on the frequency of correct, independent steps of the task analysis for solving multiplication word problems completed by high school students with ESN?

RQ 2: Can they use mathematical reasoning?

How do high school students with ESN justify their mathematical reasoning do during turn and talk when provided with a system of least prompts after peer-mediated modified-schema based instruction?

RQ 3: How is MSBI perceived?

What are the perceptions of key stakeholders (e.g., tutors and tutees) on peer-delivered math instruction?

Method

Design: Mixed methods single case research (MMSCR)

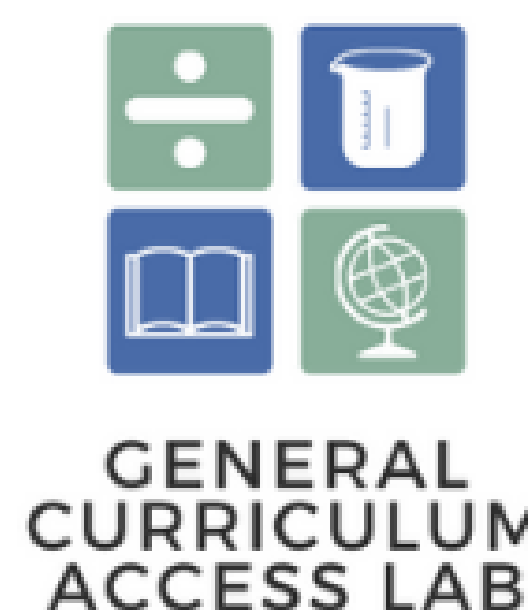
Conditions:

- Baseline
- Intervention
- Generalization (approximately every 3 probes)
- Maintenance (goal of at least 3)

Independent Variable: Peer-Mediated Modified Schema Based Instruction (MSBI)

Dependent Variables:

- Number of critical steps completed independently correct
- Number of word problems correct
- Ability to use mathematical reasoning



Participants & Setting

Setting: separate classroom, one-on-one

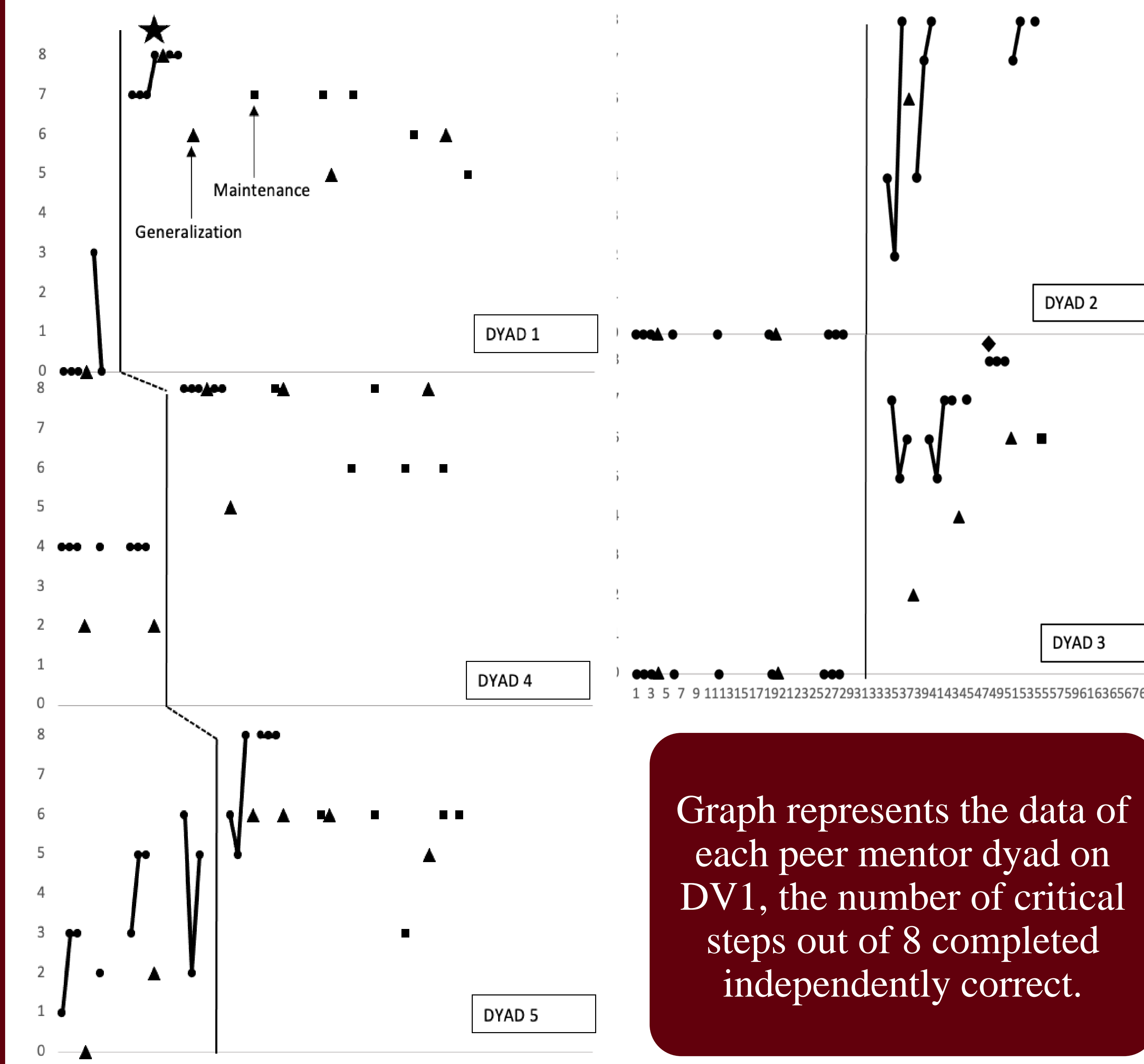
Peer Mentees				
	Grade	Gender	Race	Disability
Eve	Senior	Female	Asian American	Intellectual Disability
Parker	Senior	Male	White	Autism Spectrum Disorder
Janelle	Freshman	Female	Black	Intellectual Disability
Patrick	Freshman	Male	White	Intellectual Disability and Autism Spectrum Disorder
Ezra	Freshman	Male	Multiracial	Intellectual Disability

Peer Mentors				
	Grade	Gender	Race	Experience
Abby	Senior	Female	White	Multi-Year Mentor
Ashley	Junior	Female	White	Multi-Year Mentor
Nick	Senior	Male	White	Multi-Year Mentor
Evan	Senior	Male	White	Multi-Year Mentor

Procedures

Baseline	<ul style="list-style-type: none"> Given word problem, task analysis, schema, virtual manipulatives No system of least prompts, error correction, or peer support
Lesson 1	<ul style="list-style-type: none"> Vocabulary (e.g., equal, factors, multiply, multiplication) Conceptual overview of multiplication
Lesson 2	<ul style="list-style-type: none"> Review vocabulary Practice multiplication with manipulatives (i.e., cubes and virtual)
Lesson 3	<ul style="list-style-type: none"> Review vocabulary, concepts Guided practice solving problems with virtual worksheet Introduce self-monitoring and self-graphing
Intervention	<ul style="list-style-type: none"> Began with reviewing goal Prompting hierarchy: verbal, specific verbal, model
Maintenance	<ul style="list-style-type: none"> Given word problem, task analysis, schema, virtual manipulatives No system of least prompts, error correction, or peer support
Generalization	<ul style="list-style-type: none"> Given word problem, task analysis, virtual manipulatives Fade schema No system of least prompts, error correction, or peer support

Results



Limitations / Future Research

COVID-19
Related
Attendance

Narrow
Generalization

Structured
Turn and Talk

Teacher
Implemented

References

- Alegre Ansuategui, F. J., Moliner Miravet, L., Lorenzo Valentín, G., & Maroto, A. (2018). Peer tutoring and academic achievement in mathematics: a meta-analysis. *EURASIA: Journal of Mathematics, Science and Technology Education, 14*(1), 337-354. DOI: 10.12973/ejmste/79805.
- Davis, L. L. (2016). *Effects of peer-mediated instruction on mathematical problem solving for students with moderate/severe intellectual disability* (Doctoral dissertation, The University of North Carolina at Charlotte).
- Okilwa, N. S., & Shelby, L. (2010). The effects of peer tutoring on academic performance of students with disabilities in grades 6 through 12: A synthesis of the literature. *Remedial and Special Education, 31*, 450-463.